

Notice of Allowability	Application No.	Applicant(s)	
	10/635,731	UKENA ET AL.	
	Examiner	Art Unit	
	Lana N. Le	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 08/06/03.
2. ☒ The allowed claim(s) is/are 1-4, 7-13 and 16-19.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with applicant's representative, Lawrence Ashery, on 11/01/05.
3. The application has been amended as follows:
 - cancel claims 5-6, and 14-15;
 - in claim 7, line 14, after "device", delete ----(rewritable circuit)-----;
 - in claim 19, line 8, after "device", delete ----(rewritable circuit)-----.

REASON FOR ALLOWANCE

4. Claims 1-4, 7-13, and 16-19 are allowable over the cited prior art.
5. The following is an examiner's statement of reasons for allowance:

Regarding independent claim 1, Kobayakawa (US 2002/0,163,977) disclose a deviation compensation apparatus comprising:

a plurality of antenna elements (101sub1-101subN; figs. 8a-8b and hereafter);

amplifiers (nonlinear element 3sub1-3sub4) respectively connected to the plurality of antenna elements (para. 78);

Art Unit: 2685

an amplitude phase deviation compensation section (8a, 8b) positioned on at least any of a plurality of antenna arrays having the antenna elements and nonlinear elements for amplification (3sub1-3sub4) to compensate for deviation in amplitude and phase occurring in the nonlinear elements for amplification (3sub1-3sub4) (para. 108; para. 114);

Takabayashi et al (JP 2002-190712), assigned to the same assignee of the present application, disclose an array antenna system comprising:

a plurality of antenna elements (array antenna 208; fig. 4 and hereafter);
power amplifiers (206) respectively connected to the plurality of antenna elements (208) (para. 23);

an amplitude phase distortion adding section (204) positioned on at least any of a plurality of antenna arrays having the antenna elements and power amplifiers (206) for amplification to compensate for a nonlinear distortion in amplitude and phase occurring in the power amplifiers (206) for amplification (para. 24); and an amplitude phase control section (203) (para. 23).

However, Kobayakawa, Takabayashi et al, and the cited prior art fail to disclose:

any one of an amplitude distortion adding section for compensating for an amplitude nonlinear distortion, occurring in the power amplifier, and a phase distortion adding section for compensating for a phase nonlinear distortion positioned on any of the antenna arrays other than the antenna arrays having the amplitude-phase distortion adding section;

the amplitude-phase control section for controlling an amplitude weighting amount and phase rotation amount on a transmission signal based on each antenna array in order to beam-control in a designated direction.

Regarding independent claim 7, Kobayakawa (US 2002/0,163,977) discloses an array antenna apparatus comprising:

- a plurality of antenna elements (101sub1-101subN; figs. 8a-8b);

- a plurality of amplifiers (nonlinear devices 3sub1-3sub4) respectively connected to the plurality of antenna elements (para. 78);

- a deviation compensating section (8a, 8b) positioned on a plurality of antenna arrays having the antenna element and the amplifier, to compensate for amplitude and phase deviation occurring in the amplifiers (paras. 78, 114).

Takabayashi et al (JP 2002-190712), assigned to the same assignee of the present application, disclose an array antenna system comprising:

- a plurality of antenna elements (array antenna 208; fig. 4 and hereafter);

- a plurality power amplifiers (206) respectively connected to the plurality of antenna elements (208) (para. 23);

- a distortion adding section (204) positioned on a plurality of antenna arrays having the antenna element and power amplifier (206) to compensate for a nonlinear distortion in amplitude and phase occurring in the power amplifier (206) (para. 24); and an amplitude phase control section (203) (para. 23).

However, Kobayakawa, Takabayashi et al, and the cited prior art fail to disclose:

the amplitude-phase control section for controlling, based on each antenna array, an amplitude weighting amount and phase rotation amount in order to beam-control in a designated direction;

whereby the distortion adding section is configured by using a reconfigurable device to rewrite a circuit configuration of the reconfigurable device according to the amplitude weighting amount and phase rotation amount.

Regarding independent claim 19, Kobayakawa (US 2002/0,163,977) discloses a communication apparatus comprising:

a plurality of antenna elements (101sub1-101subN; figs. 8a-8b and hereafter);

a plurality of amplifiers (nonlinear elements 3sub1-3sub4) respectively connected to each of the antenna elements (para. 78); an amplitude and phase deviation compensation section (8a, 8b) for compensating for a deviation in amplitude and phase occurring in the amplifier (nonlinear elements 3sub1-3sub4) (para. 114).

Takabayashi et al (JP 2002-190712), assigned to the same assignee of the present application, disclose an array antenna system comprising:

a plurality of antenna elements (array antenna 208; fig. 4 and hereafter);

a plurality power amplifiers (206) respectively connected to each of the antenna elements (208) (para. 23);

an amplitude phase distortion adding section (204) for compensating for a nonlinear distortion in amplitude and phase occurring in the power amplifier (206) (para. 24); and an amplitude phase control section (203) (para. 23).

However, Kobayakawa, Takabayashi et al, and the cited prior art fail to disclose:

a MIMO communication apparatus comprising a reconfigurable device constituting any one of an amplitude distortion adding section to compensate for a nonlinear distortion in amplitude and a phase distortion adding section to compensate for a nonlinear distortion in phase, and positioned on each of the antenna arrays having the antenna element and the power amplifier;

the amplitude-phase control section for controlling an amplitude weighting amount and phase rotation amount on a transmission signal based on each antenna array, in order to beam-control in a designated direction and a reception antenna for receiving a propagation environment signal to notify a propagation environment of a signal sent at the plurality of antennas;

whereby the amplitude weighting amount and phase rotation amount is determined according to a reception signal from the reception antenna, the amplitude-phase distortion adding section and any one of the amplitude distortion adding section and the phase distortion adding section being arranged according to the amplitude weighting amount and phase rotation amount.

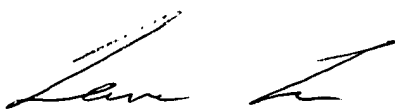
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lana Le

November 13, 2005



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